

LONDON- WEST MIDLANDS ENVIRONMENTAL STATEMENT

Volume 5 | Technical Appendices

CFA18 | Stoneleigh, Kenilworth and Burton Green

Data appendix (AG-001-018)

Agriculture, forestry and soils

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1 Introduction

1.1.1 The agriculture, forestry and soils appendices for the Stoneleigh, Kenilworth and Burton Green community forum area (CFA18) comprise:

- Soils and agricultural land classification surveys (Section 2);
- Forestry (Section 3); and
- Farm impact assessment summaries (Section 4).

1.1.2 Maps referred to throughout the agriculture, forestry and soils appendix are contained in the Volume 5 agriculture, forestry and soils map book.

2 Soils and agricultural land classification surveys

2.1 Background

- 2.1.1 The soils and agricultural baseline conditions reported have been established from desktop studies and site surveys.
- 2.1.2 Information gathered by desktop studies has related primarily to the identification of soil resources in the study area, the associated physical characteristics of geology, topography and climate which underpin the assessment of agricultural land quality, and the disposition of land uses. The main sources of information have included:
- National Soil Map¹;
 - Soils and Their Use in Midland and Western England²;
 - Soils in Warwickshire V Sheet SP27/37 (Coventry South)³;
 - Solid and superficial deposits from the Geology of Britain viewer⁴;
 - Gridpoint meteorological data for Agricultural Land Classification of England and Wales⁵;
 - Provisional Agricultural Land Classification of England and Wales (1:250,000)⁶;
 - Likelihood of Best and Most Versatile Agricultural Land (1:250,000)⁷;
 - Agri-environment schemes⁸;
 - Aerial photography from Google Earth; and
 - On-site soil and Agricultural Land Classification surveys.
- 2.1.3 Information gathered by field survey⁹ has related to the enhancement of desk-based information on soils and agricultural land quality, and the engagement with landowners and tenants to establish the nature and extent of agricultural, forestry and related rural enterprises.
- 2.1.4 Field and other data were interpreted using the MAFF's 1988 Revised Guidelines and Criteria for Grading the Quality of Agricultural Land¹⁰.

¹ Cranfield University (2001), *The National Soil Map of England and Wales 1:250,000 scale*. Cranfield University: National Soil Resources Institute.

² Soil Survey of England and Wales (1984), *Soils and Their Use in Midland and Western England*. Harpenden.

³ Beard, G. R., 1984, *Soils in Warwickshire V Sheet SP27/37 (Coventry South)*, Soil Survey Record No. 81, Harpenden.

⁴ British Geological Survey. <http://bgs.ac.uk/geologyofbritain/home/html>. Last accessed 24/09/2013.

⁵ Meteorological Office (1989), *Gridpoint Meteorological data for Agricultural Land Classification of England and Wales and other Climatological Investigations*.

⁶ Ministry of Agriculture, Fisheries and Food (1983), *Agricultural Land Classification of England and Wales (1:250,000)*.

⁷ Department for Environment, Food and Rural Affairs (2005), *Likelihood of Best and Most Versatile Agricultural Land (1:250,000)*.

⁸ Multi-Agency Geographical Information for the Countryside (MAGIC) available on line @ www.magic.gov.uk. Last accessed 24/09/2013.

⁹ Hodgson, J.M. (1997), *The Soil Survey Field Handbook*. Soil Survey Technical Monograph no. 5, Silsoe.

¹⁰ Ministry of Agriculture, Fisheries and Food (1988), *Agricultural Land Classification of England and Wales – Revised guidelines and criteria for grading the quality of agricultural land*.

- 2.1.5 Information obtained from farm impact assessment interview surveys has been taken as a factual representation of local agricultural and forestry interests and has not been subject to further evaluation.

2.2 Soils and land resources

- 2.2.1 This part of the technical appendix describes the findings of a desktop study and targeted soil survey and Agricultural Land Classification (ALC) survey that identified existing soil and agricultural land resources in the study area.

- 2.2.2 The location and extent of different soil types and agricultural land in the different ALC grades are influenced by topography and drainage, and by geology and soil parent materials, which are described in turn in the following sections. This section then provides a description and distribution of the main soil types encountered along the study corridor.

Topography and drainage

- 2.2.3 The route of the Proposed Scheme passes into the south-east of the study area across the A445 Leicester Lane, Cubbington Heath at 70m to 80m above Ordnance Datum (AOD) and descends to the River Avon at 55m to 60m AOD. Towards the north-west the gently rolling country rises to a narrow plateau at Burton Green, at 130m AOD, forming a watershed between the Severn and Trent drainage systems. The softer rocks have been eroded and resistant bands of sandstone and conglomerate form prominent south-facing scarps.
- 2.2.4 The main drainage is by way of the River Avon, a tributary of the Severn, which meanders south-westwards, and by the River Sowe which flows southwards to join the Avon at Stoneleigh Park. The River Avon and River Sowe have cut deep, wide, gently sloping valleys which are flanked by a series of flat river terraces. Their main tributary, the Finham Brook, flows north-eastwards into the River Sowe and has also cut deeply into the landscape.

Geology and soil parent materials

- 2.2.5 Superficial deposits, predominantly fluvial in origin, are present sporadically along the Proposed Scheme associated with surface watercourses. River terrace deposits (sand and gravel) and alluvium (silt and clay) are present associated with major surface watercourses to the north-west of Stoneleigh Park and to the north-west of Dalehouse Lane respectively. Alluvium is also present, associated with Canley Brook and one of its tributaries to the north-west of the A429 Kenilworth Road, and to the east of Birches Wood Farm. A cover of the Oadby Till, a varied glacial deposit, extends from Burton Green to Little Beanit Farm in the north of the study area.
- 2.2.6 Sandstone of the Bromsgrove Sandstone Formation underlies the majority of the Proposed Scheme. Sandstones and occasional mudstones of the Kenilworth Sandstone Formation underlie the route from the south of the study area to Gooseberry Hall, Kenilworth. Northwards from Gooseberry Hall, the Proposed Scheme will be underlain by bedrock of the Tile Hill Mudstone Formation (mudstones with subordinate sandstones and rare lenses of conglomerate).
- 2.2.7 A list of geological strata occurring within the study area is provided in age order in Table 1 and shown on Map WR-02-018 (Volume 5).

Table 1: Bedrock and soil forming materials

Formation	Composition/soil parent material
Superficial deposits	
Alluvium	Clay, silt, sand and gravel.
River terrace deposits	Sand and gravel.
Bagington Sand and Gravel (not crossed by route)	Sand and gravel with lenses of silt and clay.
Oadby Till	Diamicton with lenses of sands, gravel, clay and silt.
Mid Pleistocene Till (not crossed by route)	Diamicton, clay with flints.
Glaciofluvial deposits	Sand and gravel.
Bedrock	
Bromsgrove Sandstone Formation	Sandstones, commonly pebbly or conglomeratic at the bases of beds, interbedded siltstones and mudstones.
Kenilworth Sandstone Group (including Gibbet Hill Conglomerate)	Sandstone with subordinate beds of mudstone. Gibbet Hill Conglomerate is also present at the base of this formation.
Ashow Formation	Mudstone with subordinate beds of fine to medium grained sandstone.
Tile Hill Mudstone Formation	Mudstone with rare conglomeratic lenses.
Mercia Mudstone Group	Mudstone with subordinate bands of siltstone, halite and sandstones.

Description and distribution of soil types

- 2.2.8 The characteristics of the soils are described by the Soil Survey of England and Wales that accompanies the National Soil Map. A more detailed soil map and report are available for the CFA in the Soil Survey's Soils in Warwickshire V, SP27/37 Coventry South. The soils are grouped into soil associations of a range of soil types (soil series) and are summarised in Table 2, and their distribution is shown on Map AG-02-18.

Table 2: Soil associations

Soil association: code shown on Map AG-02-18	Soil association: name	Description	Wetness class
541b	Bromsgrove	Well drained reddish sandy loam soils over soft sandstone, deep in places; some loamy soils with slowly permeable subsoils and slight seasonal waterlogging	I-II
541f	Rivington 1	Well drained sandy loam soils over sandstone; some similar soils affected by groundwater locally	I-II
541r	Wick 1	Deep well drained sandy loam and sandy soils, locally over gravel; some similar soils affected by groundwater	I-II
572e	Whimple 2	Reddish loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging; some well drained deep sandy loams	I-III
711m	Salop	Slowly permeable seasonally waterlogged reddish loamy over clayey, loamy and clayey soils, associated with similar soils with only slight seasonal waterlogging	II-III

Soil association: code shown on Map AG-02-18	Soil association: name	Description	Wetness class
711t	Beccles 3	Slowly permeable seasonally waterlogged loamy over clayey soils, and similar soils with only slight seasonal waterlogging; some calcareous subsoils	III

2.2.9 The National Soil Map shows six principal soil types within this community forum area:

- The Bromsgrove association is mapped on reddish Carboniferous sandstones to the south and west of Stoneleigh, along the Finham Brook and on rising ground north west of the A429 road; it contains well drained reddish sandy loam soils over soft and hard sandstone, with deeper soils in places in Wetness Class¹¹ (WC I); there are also some clay loam soils with slowly permeable subsoils in mudstone that experience slight seasonal waterlogging (WC II). In alluvium of the Finham Brook and its tributaries there is the clay loam textured Trent series (WC III);
- From Furze Hill across Leicester Lane towards Stoneleigh Park on the Bromsgrove Sandstone Formation occur sandy loam soils over sandstone in the Rivington 1 association; the soils are well drained (WC I) but locally, similar soils over interbedded sandstone and mudstone are affected by groundwater (WC II);
- Soils of the Wick 1 association are of limited occurrence on terraces of the River Avon north of Stoneleigh Park; they consist of deep sandy loams, mostly well drained (WC I) but with slight seasonal waterlogging where affected by groundwater (WC II). The association includes the alluvial clayey Fladbury series (WC IV) in valley bottoms bordering the River Avon
- Carboniferous reddish mudstones and interbedded sandstones form the subsoils along several sections of the proposed route north-westwards from the A46 road; the soils of the Whimple 2 association consist of reddish clay loam over clay with slowly permeable subsoils and slight seasonal waterlogging (WC II), becoming wetter on higher ground in the west (WC III); locally, reddish sandy loam soils over sand or soft sandstone are well drained (WC I); and
- Over the half kilometre at the north-western end of the CFA at Burton Green are slowly permeable and seasonally waterlogged clay loam soils of the Salop (WC III to IV) and sandy clay loam to clay loam Beccles 3 associations (WC III) developed in Oadby Till.

¹¹ The Wetness Class (WC) of a soil is classified in Appendix II of Hodgson, J.M. (1977), *The Soil Survey Field Handbook*. Soil Survey and Land Research Centre, Technical Monograph No.5, according to the depth and duration of waterlogging in the soil profile and has six bands ranging from Wetness Class I (well drained) to Wetness Class VI (permanently waterlogged).

2.3 Soil and land use interactions

Agricultural land quality

- 2.3.1 A review of available ALC information has been undertaken to ascertain the land quality within the study area. The review also sought to identify the extent of existing detailed post-1988 ALC information to ensure that surveys are not repeated unnecessarily. However, there are none within the study area.
- 2.3.2 Higher confidence levels have been gained in this CFA from assessing land quality from a detailed soil survey (Soils in Warwickshire V Sheet SP27/37 (Coventry South)), and from field surveys for this project.

Detailed agricultural land classification

- 2.3.3 ALC has been assessed from available soil information in the form of 245 archived Soil Survey records obtained from the National Soil Resources Institute (NSRI) at Cranfield University and specific to the detailed soil survey (Beard 1984). With the existence of the detailed soil map and 245 archived auger bore records, no additional soil surveys were carried out.
- 2.3.4 The principal physical factors influencing agricultural production and land quality in this CFA are climate, site and soil and the interactions between them.
- 2.3.5 Soil profiles were examined using an Edelman (Dutch) auger and a spade. Where soils were stony or dry a 2.5cm diameter screw auger was used to enable deeper penetration. At each observation point the following characteristics were assessed for each soil horizon up to a maximum of 120cm where possible, or to any impenetrable layer:
- soil texture;
 - significant stoniness;
 - colour (including local gley and mottle colours);
 - consistency;
 - structural condition;
 - free carbonate; and
 - depth.
- 2.3.6 Soil available water capacity, relevant to the assessment of drought risk, was estimated from texture, structure, organic matter content, stone content and profile depth.

Agro-climatic limitations

- 2.3.7 The local climatic factors have been interpolated from the Meteorological Office's database (Met Office 1989) held in the Landis climatic database at Cranfield University¹² at 1 km intervals along the line of the track. The average of the

¹² <http://archive.defra.gov.uk/foodfarm/landmanage/land-use/documents/alc-guidelines-1988.pdf> Accessed Aug 2103.

parameters is given in Table 3. There is little variation across the CFA: FCDs are within the range 141 to 160 days; average annual rainfall (AAR) is from 645mm to 707mm; moisture deficits are 93mm to 103mm for wheat and 81mm to 94mm for potatoes.

Table 3: Interpolated agro-climatic data

Climatic parameter	A445 Crossing SP 3362 7063	A429 Crossing SP 3056 7361	Burton Green SP 2670 7605
Altitude (m)	70	74	131
Average annual rainfall (mm)	645	669	707
Accumulated Temperature >0°C (Jan-June)	1409	1404	1339
Field Capacity Days (days)	141	151	160
Average Moisture Deficit, wheat (mm)	103	102	93
Average Moisture Deficit, potatoes (mm)	94	93	81

- 2.3.8 Climate itself does not place any limitation upon the land, but the interactions of climate with soil characteristics are important in determining the wetness and droughtiness limitations of the soil.
- 2.3.9 The influence of climate on soil wetness is assessed by reference to median Field Capacity Days (FCD) when the soil moisture deficit is zero, soil WC and topsoil texture (Table 6, ALC Guidelines, 1988)¹⁰. Soil WC was inferred from the matrix colour, presence or absence of, and depth to, greyish and ochreous gley mottling and/or poorly permeable subsoil layers at least 15cm thick.
- 2.3.10 The ALC grade according to soil wetness was determined by following the methodology set out in the ALC Guidelines (October, 1988)¹⁰ and the information in the Table 4.

Table 4: ALC grade according to soil wetness – mineral soils (From Table 6 of ALC Guidelines, October 1988)¹⁰

Wetness class	Texture ¹ of the top 25 cm	Field capacity days				
		<126	126-150	151-175	176-225	>225
I	S ₂ LS ₃ SL SZL	1	1	1	1	2
	ZL MZCL MCL SCL	1	1	1	2	3a
	HZCL HCL	2	2	2	3a	3b
	SC ZC C	3a(2)	3a(2)	3a	3b	3b
II	S ₂ LS ₃ SL SZL	1	1	1	2	3a
	ZL MZCL MCL SCL	2	2	2	3a	3b
	HZCL HCL	3a(2)	3a(2)	3a	3a	3b
	SC ZC C	3a(2)	3b(3a)	3b	3b	3b
III	S ₂ LS SL SZL	2	2	2	3a	3b
	ZL MZCL MCL SCL	3a(2)	3a(2)	3a	3a	3b
	HZCL HCL	3b(3a)	3b(3a)	3b	3b	4
	SC ZC C	3b(3a)	3b(3a)	3b	4	4

Wetness class	Texture ¹ of the top 25 cm	Field capacity days				
		<126	126-150	151-175	176-225	>225
IV	S ² LS SL SZL	3a	3a	3a	3b	3b
	ZL MZCL MCL SCL	3b	3b	3b	3b	3b
	HZCL HCL	3b	3b	3b	4	4
	SC ZC C	3b	3b	3b	4	5
V	S LS SL SZL	4	4	4	4	4
	ZL MZCL MCL SCL	4	4	4	4	4
	HZCL HCL	4	4	4	4	4
	SC ZC C	4	4	4	5	5

Soils in Wetness Class VI – Grade 5

Texture key: S - sand; LS - loamy sand; SL - sandy loam; SZL - sandy silt loam; ZL - silt loam; MZCL - medium silty clay loam; MCL - medium clay loam; SCL - sandy clay loam; HZCL - heavy silty clay loam; HCL - heavy clay loam; SC - sandy clay; ZC - silty clay; C - clay

¹ For naturally calcareous soils with more than 1% CaCO₃ and between 18% and 50% clay in the top 25 cm, the grade, where different from that of other soils, is shown in brackets.

² Sand is not eligible for Grades 1, 2 or 3a.

³ Loamy sand is not eligible for Grade 1.

- 2.3.11 Droughtiness is determined by comparing crop-adjusted available water (AP), with the moisture deficit (MD) for the locality for wheat and potatoes (MAFF 1988 Appendix 4). Grading of the land can be affected if the AP is insufficient to balance the MD and droughtiness occurs. The availability of irrigation can improve grading by one division where appropriate. However, irrigation is not common practice for grass cereals and oil seed rape (OSR). The calculation used in the ALC Guidelines (October, 1988)¹⁰ to determine the severity of this limitation is given below in Figure 1.

Figure 1: Methodology for calculating the severity of a droughtiness limitation to ALC grading (derived from MAFF, 1988)

$$AP \text{ wheat (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{50}) + \sum (EA_{vs} \times LT_{50-120})}{10}$$

where

TA_{vt} is Total available water (TA_v) for the topsoil texture

TA_{vs} is Total available water (TA_v) for each subsoil layer

EA_{vs} is Easily available water (EA_v) for each subsoil layer

LT_t is thickness (cm) of topsoil layer

LT_{50} is thickness (cm) of each subsoil layer to 50 cm depth

LT_{50-120} is thickness (cm) of each subsoil layer between 50 and 120 cm depth

Σ means 'sum of'.

$$AP \text{ potatoes (mm)} = \frac{TA_{vt} \times LT_t + \sum (TA_{vs} \times LT_{70})}{10}$$

where

LT_{70} is thickness (cm) of each subsoil layer to 70 cm depth

MB (Wheat) = AP (Wheat) - MD (Wheat)

MB (Potatoes) = AP (Potatoes) - MD (Potatoes)

Where

MB is the Moisture Balance

AP is the Crop-adjusted available water capacity

MD is the moisture deficit, as determined by the agro-climatic assessment.

Table 8 Grade according to droughtiness

Grade/ Subgrade	Moisture Balance limits (mm)		
	<i>wheat</i>		<i>potatoes</i>
1	+30	<i>and</i>	+10
2	+5	<i>and</i>	-10
3a	-20	<i>and</i>	-30
3b	-50	<i>and</i>	-55
4	<-50	<i>or</i>	<-55

Site limitations

- 2.3.12 The assessment of site limitations is primarily concerned with the way in which topography influences the use of agricultural machinery and hence the cropping potential of land. Gradient and microrelief¹³ are not considered limiting in this CFA.
- 2.3.13 Flooding is restricted to the floodplains of the Avon, Sowe, Finham Brook and their tributaries. The duration, frequency and timing of flood events are not considered limiting to agricultural land quality in this area.

Soil limitations

- 2.3.14 The main soil properties which affect the cropping potential and management requirements of land are texture, structure, depth, stoniness and chemical fertility. Together they influence the functions of soil and affect the water availability for crops, drainage, workability and trafficability. The main soil characteristics within the CFA are sandy loam textures over Kenilworth and Bromsgrove Sandstones and deep sandy loam in places over gravels in river terrace drifts; and medium and heavy clay loam over clayey textures, with poor subsoil structure and slow permeability, over Tile Hill Mudstone, Ashow Formation mudstones and till. Soil depth and chemical limitations are not encountered.

Interactive limitations

- 2.3.15 The physical limitations which result from interactions between climate, site and soil are soil wetness, droughtiness and erosion. Each soil can be allocated a WC based on soil structure, evidence of waterlogging and the number of FCDs; the topsoil texture then determines its ALC Grade. Sandy loam soils over sandstone of the Bromsgrove and Rivington 1 associations and deep sandy loam and sandy soils of the Wick 1 association are permeable and largely well drained (WC I) or have slight seasonal waterlogging (WC II) where affected by fluctuating groundwater, and in all cases are without a wetness limitation. Land with soils typical of the Whimple 2 association with a medium clay loam topsoil will be limited to Grade 2 if in Wetness Class II, or to Subgrade 3a if in Wetness Class III. Seasonally waterlogged soils (WC III) of the Salop and Beccles 3 associations will be limited to Subgrade 3a where the topsoil is medium clay loam, but Subgrade 3b where heavy clay loam; locally in wetter situations difficult to drain (WC IV) both medium and heavy clay loam topsoil textures will limit the land to Subgrade 3b.
- 2.3.16 Soil texture and structure determine the available water capacity of the soil profile. When calculated against the demands of a growing wheat and potato crop in the locality given by the climatic variable, the moisture deficit (MDM), a moisture balance is produced from which a droughtiness limitation can be assessed. The clay loam over clay soils of the Whimple 2, Salop and Beccles 3 associations have sufficient moisture reserves in an average year to have no droughtiness limitation, or only one that limits the land to Grade 2; light textured soils of the Bromsgrove, Rivington 1 and Wick 1 associations, however, tend to have a smaller available water capacity. Dominantly sandy loam soils limit the land to Grade 2 or Subgrade 3a depending on the stone content and depth over sandstone or gravels; sandy soils are Subgrade 3a or 3b, again

¹³ Complex changes of slope angle and direction over short distances or the presence of boulders or rock outcrops, even on level or gentle slopes, which can severely limit the use of agricultural machinery.

depending on the stone content. Where irrigation facilities are available, and it is a current or recent practice, this is taken into account and may raise the Grade as the potential range and yield of crops (particularly horticultural and root crops) are increased.

- 2.3.17 Grade 2 land occurs on the sandy loam soils of Wick 1 association and some of the better drained soils of the Whimple 2 association with slowly permeable subsoils, and the deeper soils of the Bromsgrove and Rivington 1 associations; the main limitation is droughtiness due to a moderately small available water capacity.
- 2.3.18 On shallower soils over sandstone in the Bromsgrove and Rivington 1 associations and stony soils of the Wick 1 association, small to moderately small available water capacities increase the droughtiness limitation to Subgrade 3a. Where soil wetness is accompanied by heavier topsoil textures, these features become the main limitation restricting the range of crops; within the Whimple 2 association, the limitation for the lead soil is only moderate in an area with FCD values of over 150 days and the land is allocated to Subgrade 3a.
- 2.3.19 Within the seasonally waterlogged soils of the Salop and Beccles 3 associations, where the wetness/texture limitation is more restrictive and the safe working period shorter, the land is classed as Subgrade 3a with 3b where topsoil textures are heavy clay loam.
- 2.3.20 Agricultural land occupying the narrow floodplains of the Avon and a tributary of the Finham Brook is distinguished as the Fladbury series, (within the Wick 1 association) and has been assessed as Subgrade 3b due to wetness. The more loamy and slightly better drained Trent series (within the Bromsgrove association) is in Subgrade 3a.

Summary of ALC assessment in CFA18

- 2.3.21 The characteristics of the soil series encountered within each association and a summary of the key characteristics relevant to the ALC grading in CFA18 are given in Table 5 to Table 10.

Appendix AG-001-018 | Soils and agricultural land classification surveys

Table 5: Bromsgrove Association (541b)

Well drained sandy loam soils over soft sandstone but deep in places. Associated loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Risk of water erosion.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 160 min 141)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Bromsgrove		Bromsgrove Sandstone, Ashow Formation and Kenilworth Sandstone Formation	150	I	101 (110-80)	91 (90-55)	2 or 3a*	Droughtiness
	Hodnet	Bromsgrove Sandstone, Ashow Formation and Kenilworth Sandstone Formation	150	II	101 (110-100)	91 (90-80)	2 or 3a	Drought with topsoil texture and wetness class locally
	Eardiston**	Bromsgrove Sandstone, Ashow Formation and Kenilworth Sandstone Formation	150	I	101 (110-80)	91 (90-55)	2, 3a or 3b*	Droughtiness
	Trent	Loamy alluvium	150	III	101 (125)	91 (105)	3a	Topsoil texture and wetness class

* Where subsoil texture is loamy sand and or stone content is moderate to high then grade is restricted to 3a but where shallow over rock it may be Subgrade 3b. ** Eardiston series is a localised particularly on crests.

Brief Soil Profile Descriptions

Bromsgrove	Hodnet	Eardiston	Trent
<p>0-30cm Ap: Dark reddish brown, stoneless sandy loam</p> <p>30-65cm Bw: Reddish brown, stoneless sandy loam; weak medium or coarse subangular blocky structure</p> <p>65-90cm BCu: Reddish brown, stoneless or slightly stony sandy loam; single grain structure</p> <p>At 90cm Cu: Soft weathered reddish brown sandstone</p>	<p>0-25cm Ap: Dark reddish brown, very slightly stony sandy silt loam or clay loam</p> <p>25-35cm Eb: Reddish brown, very slightly stony; weak coarse subangular blocky structure</p> <p>35-60cm Bt(g): Reddish brown, mottled, stoneless or slightly stony; moderate prismatic or angular blocky structure</p> <p>60-100cm Cg: Dark reddish brown, clay loam; massive structure</p> <p>100-120cm Cr: Reddish brown silty shale and sandstone</p>	<p>0-25cm Ap: Dark reddish brown, stoneless or slightly stony sandy loam or sandy silt loam</p> <p>25-40cm Bw: Reddish brown, slightly stony sandy loam; moderate medium angular blocky structure</p> <p>40-60cm BCu: Reddish brown slightly or moderately stony sandy loam; weak coarse angular blocky structure or single grain</p> <p>At 60cm R: Dark reddish grey hard bedded micaceous sandstone</p>	<p>0-25cm Ap: Dark brown, stoneless clay loam</p> <p>25-50cm Bw: Brown stoneless clay loam, moderate coarse subangular blocky structure</p> <p>50-100cm Bg: Brown, mottled, stoneless clay loam, weak medium subangular blocky structure</p>

Table 6: Rivington 1 Association (541f)

Well drained sandy loam soils over sandstone; some similar soils affected by groundwater locally. Risk of water erosion.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 160 min 141)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Rivington		Bromsgrove Sandstone Formation	150	I	101 (110-100)	91 (90-80)	2 or 3a*	Droughtiness
	Melbourne	Bromsgrove Sandstone Formation	150	II	101 (110-100)	91 (90-80)	2 or 3a	Droughtiness with topsoil texture and wetness class locally

* Where subsoil texture is loamy sand and or stone content is moderate to high then grade is restricted to 3a but where shallow over rock it may be Subgrade 3b.

Brief Soil Profile Descriptions

Rivington	Melbourne
<p>0-25cm Ap: Dark greyish brown, slightly stony sandy loam</p> <p>25-50cm Bw: Yellowish brown, slightly stony sandy loam or sandy silt loam; weak medium subangular blocky structure</p> <p>At 50cm R or Cu: Hard or soft sandstone Reddish</p>	<p>0-25cm Ap: Dark brown, slightly stony sandy loam</p> <p>25-50cm Bw: Brown, slightly stony sandy loam; moderate medium subangular blocky structure</p> <p>50-65cm BCu: Brown, mottled, slightly stony sandy loam; weak coarse angular blocky structure or single grain</p> <p>At 65cm Cu: Weathering sandstone,</p>

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Table 7: Wick 1 Association (541r)

Deep well drained sandy loam and sandy soils, locally over gravel; some similar soils affected by groundwater.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 160 min 141)	Wetness class	Average moisture deficit (mm)		ALC grade	ALC determinant
					Wheat (max 105 min 93)	Potatoes (max 97 min 81)		
Wick**		Glaciofluvial sands and gravels and river terrace	150	I	101 (110-100)	91 (90-80)	2 or 3a*	Droughtiness
	Arrow	Glaciofluvial sands and gravels and river terrace	150	II	101 (110-100)	91 (90-80)	2 or 3a*	Droughtiness
	Newport	Glaciofluvial sands and gravels and river terrace	150	I	101 (100-85)	91 (80-65)	2 or 3a*	Droughtiness
	Fladbury	Clayey alluvium	150	IV	101 (125)	91 (105)	3b	Topsoil texture and wetness class

* Where subsoil texture is loamy sand and or stone content is moderate to high then grade is restricted to 3a by drought.

** Wick series is a localised inclusion in this association particularly on crests and slopes.

Brief Soil Profile Descriptions

Wick	Arrow	Newport	Fladbury
<p>0-25cm Ap: Dark brown, slightly stony sandy loam</p> <p>25-50cm Bw1: Dark yellowish brown, slightly to moderately stony sandy loam; moderate to weak medium subangular blocky structure</p> <p>50-80cm Bw2: Yellowish brown slightly or moderately stony sandy loam or loamy sand; weak medium angular blocky structure or single grain</p> <p>80-120cm Cu: Brownish yellow, slightly or moderately stony loamy sand or sandy loam; single grain structure</p>	<p>0-25cm Ap: Dark brown, slightly stony sandy loam</p> <p>25-50cm Bw: Dark yellowish brown, slightly to moderately stony sandy loam; weak medium subangular blocky structure</p> <p>50-80cm Bwg: Brown, slightly mottled, slightly or moderately stony sandy loam or loamy sand; weak coarse subangular blocky structure</p> <p>80-120cm BCg: Brownish yellow, mottled, slightly or moderately stony loamy sand or sandy loam; single grain structure</p>	<p>0-25cm Ap: Dark brown, slightly stony sandy loam or loamy sand</p> <p>25-55cm Bw: Brown, slightly stony loamy sand; weak fine subangular blocky structure</p> <p>55-120cm Cu: Yellowish red or brownish yellow slightly or moderately stony loamy sand or sand; single grain structure</p>	<p>0-25cm Ap: Dark greyish brown, mottled, stoneless clay</p> <p>25-65cm Bg: Grey with many ochreous mottles, stoneless clay; strong coarse prismatic structure</p> <p>65-100 BCg: Grey, mottled, stoneless clay; massive structure</p>

Table 8: Whimble 2 Association (572e)

Reddish medium loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging; some well drained deep light loams

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 160 min 141)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Whimble		Ashow Formation, Kenilworth sand Formation and Tile Hill Mudstone	150	III	101 (115)	91 (100)	3a or 3b*	Topsoil texture and wetness class
	Bromsgrove	Ashow Formation and Kenilworth sand Formation	150	I	101 (110-80)	91 (90-65)	2 or 3a**	Droughtiness

* Where Subgrade is 3b the topsoil texture is heavy clay loam.

** Where subsoil texture is loamy sand then Subgrade is 3a.

Brief Soil Profile Descriptions

Whimble	Bromsgrove
0-25cm Ap: Dark brown slightly stony medium clay loam 25-40cm Eb(g): Reddish brown, slightly mottled, slightly stony clay loam; moderate medium subangular blocky structure 40-60cm Bt(g): Reddish brown, slightly mottled, slightly stony clay loam; moderate to coarse prismatic structure 60-100cm 2BCtg: Reddish brown, mottled, stoneless clay; Coarse prismatic structure At 100cm: Reddish mudstone	0-30cm Ap: Dark reddish brown, stoneless sandy loam 30-65cm Bw: Reddish brown, stoneless sandy loam; weak medium or coarse subangular blocky structure 65-90cm BCu: Reddish brown, stoneless or slightly stony sandy loam; single grain structure At 90cm Cu: Soft weathered reddish brown sandstone

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Table 9: Salop Association (711m)

Slowly permeable seasonally waterlogged reddish loamy over clay, loamy and clayey soils, associated with similar soils with only slight seasonal waterlogging.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 160 min 141)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Salop		Oadby till	150	III	101 (115)	91 (100)	3a or 3b**	Topsoil texture and wetness class
	Clifton	Oadby Till and glaciofluvial sands and gravels	150	III	101 (125)	91 (105)	2	Texture and wetness class
	Flint	Oadby Till	150	II-III	101 (115)	91 (100)	2 or 3a	Topsoil texture and wetness class

** Where Subgrade is 3b the topsoil texture is heavy clay loam.

Brief Soil Profile Descriptions

Salop	Clifton	Flint
<p>0-25cm Ap: Very dark greyish brown slightly stony medium or heavy clay loam</p> <p>25-45cm Eg: Brownish grey, mottled, slightly stony medium or heavy clay loam; moderate medium subangular blocky structure</p> <p>45-100cm 2Btg: Yellowish red, mottled, slightly stony; clay, moderate to weak coarse prismatic structure</p> <p>100-120cm BCtg: Reddish brown, mottled, slightly stony clay; massive structure</p>	<p>0-25cm Ap: Dark greyish brown slightly stony medium clay loam or sandy clay loam</p> <p>25-35cm Eg: Greyish brown, mottled slightly stony medium clay loam or sandy clay loam; weak medium subangular blocky structure</p> <p>35-80cm Btg: Reddish brown, mottled, slightly stony clay loam or sandy clay loam; moderate coarse prismatic structure</p> <p>80-120cm BCtg: Reddish brown mottled slightly stony clay loam; weak coarse prismatic or massive structure</p>	<p>0-25cm Ap: Dark brown, slightly stony medium clay loam</p> <p>25-60cm EBg: Brown, slightly mottled, slightly or moderately stony; clay loam moderate medium subangular blocky structure</p> <p>60-100cm Btg: Reddish brown, mottled, slightly stony clay strong coarse angular blocky or prismatic structure</p> <p>100-120cm BCtg: Reddish brown, mottled slightly to moderately stony clay; massive structure</p>

Table 10: Beccles 3 Association (711t)

Slowly permeable seasonally waterlogged loamy over clayey soils, and similar soils with only slight seasonal waterlogging; some calcareous subsoils.

Main soil series	Ancillary soil series occurring locally	Geology	Average field capacity days (max 160 min 141)	Wetness class	Average moisture deficit and (available water) mm		ALC grade	ALC determinants
					Wheat	Potatoes		
Beccles		Oadby till	150	III	101 (115)	91 (100)	3a or 3b*	Texture and wetness
	Ashley	Oadby Till	150	III	101 (115)	91 (100)	3a	Texture and wetness
	Hanslope	Oadby Till	150	III	101 (115)	91 100)	3a or 3b**	Texture and wetness

* Where topsoil is heavy clay loam Subgrade is 3b.

** Subgrade is 3a where topsoils are calcareous but are Subgrade 3b if the topsoil texture is decalcified heavy clay loam or clay.

Brief Soil Profile Descriptions

Beccles	Ashley	Hanslope
<p>0-25cm Ap: Dark greyish brown slightly stony medium or heavy clay loam or sandy clay loam</p> <p>25-45cm Bg: Greyish brown, mottled, slightly stony clay loam; weak or moderate medium subangular blocky structure</p> <p>45-70cm 2Btg: Greyish brown, mottled, slightly stony clay; strong medium prismatic structure, non-calcareous</p> <p>70-120cm 2BCtg: Grey, mottled, slightly stony clay; weak coarse prismatic or massive structure</p>	<p>0-25cm Ap: Dark brown slightly stony medium clay loam or sandy clay loam</p> <p>25-50cm Eg(g): Dark yellowish brown, slightly mottled slightly stony clay loam or sandy clay loam; strong medium and fine angular blocky structure</p> <p>50-70cm 2Bt(g): Dark brown, slightly mottled, slightly stony clay; moderate medium prismatic structure; slightly calcareous</p> <p>70-120cm 2BCt(g): Greyish brown mottled slightly stony clay; weak medium and coarse angular blocky structure; calcareous</p>	<p>0-25cm Ap: Dark greyish brown, slightly stony clay or heavy clay loam; slightly calcareous</p> <p>25-60cm Bw(g): Light olive brown, slightly mottled, slightly stony; clay; moderate medium subangular blocky structure; calcareous</p> <p>60-120cm BCg: Yellowish brown, mottled, slightly to moderately stony clay; moderate medium angular blocky or prismatic structure; calcareous</p>

3 Forestry

- 3.1.1 Identification of forestry resources has primarily had regard to the National Forestry Inventory¹⁴.
- 3.1.2 The area of land under forestry (i.e. trees and woodland) within 2km either side of the route centre line has been determined using GIS and is shown in Table 11.

Table 11: Area of woodland within the study area and construction boundary

	Area of forestry land (ha)	Forestry land as a % of total land area
Forestry land in study area	539.9	13
Forestry land required permanently	21.4	9

- 3.1.3 Woodland is relatively dense over the area as a whole and represents 13% of land cover, compared to the national average of 10% (i.e. the resource sensitivity is low). The main parcels of woodland occur at Stonleigh Park (CFA18/3), Crackley Wood (CFA18/13), and Broadwells Wood and Black Waste Wood (CFA18/15), as shown on Map AG-01-047 to 050 in Volume 5: Appendix AG-001-018.

¹⁴ Forestry Commission (2001), *National Forest Inventory Woodland and Ancient Woodland* (as updated).

4 Assessment of effects on holdings

- 4.1.1 The effects on holdings have been assessed according to the methodology set out in Technical Note AG5 (within Appendix CT-001-000/2). The nature of impacts considered comprises the temporary and permanent land required from the holding, the temporary and permanent severance of land, the permanent loss of key farm infrastructure and the imposition of disruptive effects (particularly noise and dust) on land uses and the holding's operations. These impacts occur primarily during the construction phase of the Proposed Scheme.

Table 12: Summary of assessment of effect on holdings

Holding reference, name and description	Temporary Effects	Permanent Effects
CFA18\1 Furzen Hill Farm 404.7ha of General cropping (cereals and vegetables) High sensitivity to change	Land required: 25.1ha; 6% of holding required for construction. Low Impact Severance: mitigated by accesses off Coventry Road and Leicester Lane. Medium Impact Disruptive effects: dust impacts on field scale vegetables will be addressed; noise impacts on equestrian services, offices and holiday lets need to be considered. Medium Impact	Land required: 13.7ha; 3% of holding taken. Negligible Impact Severance: accesses off Coventry Road and Leicester Lane will be available. Medium impact Infrastructure: reconnection of drainage and irrigation systems required. Safe access off embanked sections of Coventry Road and Leicester Lane needed. Negligible
CFA18\2 Park Farm 182 ha parcel growing wide range of field vegetables in rotation with cereals. High sensitivity to change	Land required: 19.4ha; 11% of holding required for construction. Medium Impact Severance: access will be needed off Leicester Lane. Medium Impact Disruptive effects: dust impacts on field scale vegetables will need to be addressed under CoCP. Medium Impact	Land required: 12.5ha; 7% of holding taken. Low Impact Severance: mitigated by access off Leicester Lane. Medium Impact Infrastructure: reconnection of drainage and irrigation systems required. Irrigation system shared with neighbouring farms. Reconnection of field water supply and trough system required. Negligible Impact

Holding reference, name and description	Temporary Effects	Permanent Effects
<p>CFA18\3</p> <p>Stoneleigh Park</p> <p>224 ha of mixed farmland associated with Stoneleigh Park. Key function of holding is to provide land for agricultural demonstrations, public shows and car parking.</p> <p>High sensitivity to change</p>	<p>Land required: 54.2ha; 24% of holding required for construction. High Impact</p> <p>Severance: access will be needed off Stoneleigh Road and B4115. Medium Impact</p> <p>Disruptive effects: issue of construction noise on equestrian / livestock shows and agricultural demonstrations held on farmland as well as Livestock Market. Medium Impact</p>	<p>Land required: 35.6ha; 16% of holding taken in close proximity to areas used for shows and agricultural demonstrations. Medium Impact</p> <p>Severance: mitigated by access of Stoneleigh Road and B4115. Access for large agricultural machinery to farmland used for demonstration needs special consideration. Medium Impact</p> <p>Infrastructure: reconnection of drainage, irrigation and drinking trough water supply systems required. Farm infrastructure (including silage clamp and fencing) needs replacing. Reconfiguration of field boundaries and access tracks likely to be needed. High Impact</p>
<p>CFA18\6*</p> <p>Stoneleigh Abbey</p> <p>3 ha strip of woodland running adjacent to Stoneleigh Road.</p> <p>Medium sensitivity to change</p>	<p>Land required: 0.2ha; 8% of holding required for construction. Low Impact</p> <p>Severance: none identified Negligible Impact</p> <p>Disruptive effects: none identified. Low Impact</p>	<p>Land required: 0.2ha; 8% of holding taken. Low Impact</p> <p>Severance: none identified. Negligible Impact</p> <p>Infrastructure: fencing. Negligible Impact</p>
<p>CFA18\8</p> <p>Kingswood Farm House</p> <p>6.5 ha of mainly paddocks accommodating 11 horses, for owners own amenity.</p> <p>Low sensitivity to change</p>	<p>Land required: 2.6ha; 40% of holding required for construction. High Impact</p> <p>Severance: none. Negligible Impact</p> <p>Disruptive effects: potential for noise effects (horses). Medium Impact</p>	<p>Land required: 1.7ha; 27% of holding taken in close proximity to house. High Impact</p> <p>Severance: none. Negligible Impact</p> <p>Infrastructure: reconnection of drainage and drinking trough water supply systems required; fencing. Negligible Impact</p>
<p>CFA18\9</p> <p>New Kingswood Farm</p> <p>37 ha given over to combinable arable and 75 sheep.</p> <p>Medium sensitivity to change</p>	<p>Land required: 11.2ha; 31% of holding required for construction (this includes the current farm house and buildings). High Impact</p> <p>Severance: Small parcel or permanent pasture adjacent to golf course is severed from the main farm. Access to be arranged under CoCP. Medium Impact</p> <p>Disruptive effects: assume that the functionality of the farm hub is maintained / replicated elsewhere on the holding to allow agricultural activities to function seamlessly through construction phase. Medium Impact</p>	<p>Land required: 9.5ha; 26% of holding taken (this includes the current farm house and buildings). High Impact</p> <p>Severance: safe access needed off Dalehouse Lane to severed land adjacent to golf course. Medium Impact</p> <p>Infrastructure: loss of farm buildings (including farm house and workshops); reconnection of drainage and field trough water supply system needed; fencing. High Impact</p>

Holding reference, name and description	Temporary Effects	Permanent Effects
<p>CFA18\10</p> <p>Dalehouse Farm</p> <p>12.5 ha, commercial equestrian enterprise</p> <p>High sensitivity to change</p>	<p>Land required: 7.6ha; 61% of holding required for construction. Land take of this scale means this holding is unable to continue as a viable commercial enterprise in its current form.</p> <p>High Impact</p> <p>Severance: area to east of HS2 alignment sits within construction boundary, hence no severance of agriculturally usable land.</p> <p>Negligible Impact</p> <p>Disruptive effects: horses in close proximity to construction noise.</p> <p>Medium Impact</p>	<p>Land required: 7.3ha; 58% of holding taken in close proximity to farm hub.</p> <p>High Impact</p> <p>Severance: area to east of HS2 alignment sits within ecological mitigation area, hence no severance of agriculturally usable land</p> <p>Negligible Impact</p> <p>Infrastructure: agricultural buildings (stables and a manege) become isolated within ecological mitigation area; drainage and drinking trough water supply systems would need reconnecting; fencing.</p> <p>High Impact</p>
<p>CFA18\11</p> <p>Milburn Grange</p> <p>90 ha mixed arable and livestock enterprise (cereal and potatoes, sheep and pedigree shorthorn cattle)</p> <p>Medium sensitivity to change</p>	<p>Land required: 17.5ha; 20% of holding required for construction.</p> <p>Medium Impact</p> <p>Severance: eastern two quarters of farm severed from the west. Daily access will need to be arranged under CoCP.</p> <p>Low Impact</p> <p>Disruptive effects: farm house close to HS2 alignment.</p> <p>Medium Impact</p>	<p>Land required: 14.9ha; 17% of holding taken in close proximity to farm hub.</p> <p>Medium Impact</p> <p>Severance: eastern two quarters of farm severed from the west. Access provided by Milburn Grange overbridge and retention of existing crossing of Warwick to Coventry railway line.</p> <p>Low Impact</p> <p>Infrastructure: drainage and drinking trough water supply systems would need reconnecting. Farm infrastructure (e.g. silage clamp and fencing) to be replaced. Note farm house and traditional farm buildings have shallow foundations.</p> <p>High Impact</p>
<p>CFA18\12</p> <p>Cryfield Grange</p> <p>105.2ha of Mainly arable and some woodland</p> <p>High sensitivity to change</p>	<p>Land required: 33.4ha; 32% of holding required for construction, including part of a recently planted woodland (Jubilee Wood).</p> <p>High Impact</p> <p>Severance: area to west of HS2 alignment in construction zone, hence no agricultural land severed.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Low Impact</p>	<p>Land required: 29.1ha; 28% of holding taken.</p> <p>High Impact</p> <p>Severance: None, severed land given over to planting.</p> <p>Negligible Impact</p> <p>Infrastructure: sections of Jubilee Wood lost to Hs2 need replanting; drainage systems need reconnecting; Canley Brook diversion needs to be implemented in a way that retains agricultural function; access to abstraction point to be maintained.</p> <p>Negligible Impact</p>

Holding reference, name and description	Temporary Effects	Permanent Effects
<p>CFA18\13</p> <p>Crackley Farm</p> <p>40 ha given over to 145 head of pedigree beef with small area of maize</p> <p>Medium sensitivity to change</p>	<p>Land required: 8.7ha; 21% of holding required for construction. The main effect is to reduce the area of land within holding for slurry disposal which means alternative land or a reduced stocking density would be required. This is likely to make current pedigree beef enterprise commercially unviable.</p> <p>High Impact</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Disruptive effects: none</p> <p>Low Impact</p>	<p>Land required: 8.6ha; 21% of holding taken.</p> <p>High Impact (see opposite)</p> <p>Severance: none</p> <p>Negligible Impact</p> <p>Infrastructure: reconnection of water trough supply system needed; fencing</p> <p>Negligible Impact</p>
<p>CFA18/14*</p> <p>Birches Wood</p> <p>Desk study indicates grassland cut for hay</p> <p>Low sensitivity to change</p>	<p>Land required: 1.7ha; 33% of holding required for construction.</p> <p>High Impact</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Disruptive effects: none to agricultural assets.</p> <p>Low Impact</p>	<p>Land take: 1.3ha; 26% of holding taken.</p> <p>Severance: none.</p> <p>Negligible Impact</p> <p>Infrastructure: fencing and access.</p> <p>Negligible Impact</p>
<p>CFA18/15</p> <p>South Hurst and Bockendon Grange Farms</p> <p>Remote land parcel to large 1093 ha cereals enterprise</p> <p>Medium sensitivity to change</p>	<p>Land required: 47.2ha; 4% of holding required for construction in close proximity to farm hub.</p> <p>Negligible Impact</p> <p>Severance: land adjacent to Greenway severed from rest of parcel. Access will need to be provided under CoCP.</p> <p>Low impact</p> <p>Disruptive effects: residential let at South Hurst Farm close to construction and operational zones.</p> <p>Medium Impact</p>	<p>Land take: 42.4ha; 4% of holding taken in close proximity to farm hub.</p> <p>Severance: severance mitigated by footpath underpass sized for agricultural traffic.</p> <p>Low Impact</p> <p>Infrastructure: functionality of drainage systems will need to be reinstated.</p> <p>Negligible Impact</p>
<p>CFA18\16*</p> <p>Burton Green Farm</p> <p>23.7ha of combinable arable crops</p> <p>Medium sensitivity to change</p>	<p>Land required: 8.3ha; 35% of holding required for construction.</p> <p>High Impact</p> <p>Severance: none identified.</p> <p>Negligible Impact</p> <p>Disruptive effects: none identified.</p> <p>Negligible Impact</p>	<p>Land required: 2.3ha; 10% of holding taken.</p> <p>Low Impact</p> <p>Severance: none identified.</p> <p>Negligible Impact</p> <p>Infrastructure: functionality of drainage systems will need to be reinstated.</p> <p>Negligible Impact</p>

Holding reference, name and description	Temporary Effects	Permanent Effects
CFA18\17* Moat House Farm Outlying field to cereals enterprise (19 ha) Medium sensitivity to change	Land required: 3.0ha; 16% of holding required for construction (majority of this outlying field within construction zone). Medium Impact Severance: none (key impact is land take). Negligible Impact Disruptive effects: none identified. Negligible Impact	Land required: 3.0ha; 16% of holding taken (majority of this outlying field taken by Burton Green Auto-transformer Feeder Station, access roads and ecological mitigation). Medium Impact Severance: none (key impact is land take). Negligible Impact Infrastructure: : functionality of drainage systems will need to be reinstated. Negligible Impact
CFA18\18 Little Beanit Farm Aberdeen Angus herd and a wide range of diversified enterprises Medium sensitivity to change	Land required: 17.4ha; 30% of holding required for construction in close proximity to farm hub and diversified activities. High Impact Severance: land to east of Greenway severed from the rest of the farm. Access needs to be maintained under CoCP. Low Impact Disruptive effects: noise impacts on commercial equestrian enterprise and potentially holiday lets. Medium Impact	Land required: 8.9ha; 15% of holding taken in close proximity to farm hub and diversified activities. Medium Impact Severance: severance mitigated by provision of footpath overbridge sized to accommodate agricultural traffic. Low Impact Infrastructure: possible loss of agricultural infrastructure (manege and silage clamp); functionality of drainage and field water supply systems will need to be reinstated; fencing. High Impact
CFA18\19 Odnauil Farm 2.4ha of Equestrian (non-commercial) Low sensitivity to change	Land required: 2.1ha; 88% of holding required for construction. This scale of land take makes the holding unviable. High Impact Severance: none (key impact is land take). Negligible Impact Disruptive effects: N.A. (key impact is land take). Negligible Impact	Land required: 2.1ha; 86% of holding taken. High Impact (see opposite) Severance: none (key impact is land take). Negligible Impact Infrastructure: loss of agricultural and residential buildings. High Impact
CFA18\20 Crabmill Farm 3.1ha of Mainly livestock (cattle and sheep) Medium sensitivity to change	Land required: 0.4ha; 12% of holding required for construction. Medium Impact Severance: none identified. Negligible Impact Disruptive effects: none identified. Low Impact	Land required: 0.3ha; 8% of holding taken (road realignment). Low Impact Severance: none identified. Negligible Impact Infrastructure: no infrastructure issues identified. Negligible Impact

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Holding reference, name and description	Temporary Effects	Permanent Effects
CFA18\21* Land adjacent to Waste Lane 1.4ha of Equestrian (non\commercial) Low sensitivity to change	Land required: 1.4ha; 97% of holding required for construction (Waste Lane overbridge satellite compound). Remainder of holding unlikely to be viable for accommodating horses during construction period. High Impact Severance: none (key impact is land take). Negligible Impact Disruptive effects: potential noise impact on horses. Low Impact	Land required: 0.4ha; 30% of holding taken (road embankment). High Impact Severance: none. Negligible Impact Infrastructure: water supply for drinking troughs will need reconnecting; fencing. Medium Impact
CFA18\22 Land north\west of Waste Lane 2.5ha of Grassland Medium sensitivity to change	Land required: 0.4ha; 17% of holding required for construction. Medium Impact Severance: none. Negligible Impact Disruptive effects: none identified. Low Impact	Land required: 0.1ha; 4% of holding taken. Negligible Impact Severance: none. Negligible Impact Infrastructure: no impacts identified Negligible Impact
CFA18\23* Land to north of Red Lane 2.5ha of Mainly arable Medium sensitivity to change	Land required: 1.6ha; 65% of holding required for construction. Field becomes unviable for agricultural production. High Impact Severance: none (key impact is land take). Low Impact Disruptive effects: none. Negligible Impact	Land required: 1.6ha; 64% of holding taken. High Impact (see opposite) Severance: severed by alterations to Greenway. Low Impact Infrastructure: : functionality of drainage systems will need to be reinstated. Negligible Impact
CFA18\25 Little Poors Woods 1.6ha of Woodland Low sensitivity to change	Land required: 0.2ha; 15% of holding required for construction. Medium Impact Severance: none. Negligible Impact Disruptive effects: none identified. Negligible Impact	Land required: 0.2ha; 15% of holding taken. Medium Impact Severance: none. Negligible Impact Infrastructure: fencing. Negligible Impact
CFA18\26 Land to south of Hodgett's Lane 0.8ha of Equestrian (non-commercial) Low sensitivity to change	Land required: 0.6ha; 75% of holding required for construction. Remainder of holding unlikely to be viable for accommodating horses during construction period. High Impact Severance: none, land take is key issue. Negligible Impact Disruptive effects: noise effect on horses. Medium Impact	Land required: 0.2ha; 22% of holding taken. High Impact Severance: none. Negligible Impact Infrastructure: stables demolished; water supply for drinking troughs will need reconnecting; fencing. High Impact

* No farm impact assessment interview conducted; data estimated.

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